



A range extension of *Gentiana capitata* Buch.-Ham. ex D.Don subsp. *harwanensis* (G.Singh) Halda (Gentianaceae) to Ladakh Trans-Himalaya, India

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Abstract

We collected *Gentiana capitata* subsp. *harwanensis* for the first time from Suru valley in Kargil district of Ladakh region, India, and thus extend this subspecies' geographic distribution to the Trans-Himalayan biogeographic region. This subspecies is endemic to India and so far recorded from the North-west and Western Himalaya of India.

Key words

Trans-Himalayan biogeographic region; endemic species; new habitat; Suru valley.

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Introduction

The genus *Gentiana* L. was first established by Linnaeus in his *Species Plantarum* (1753). Currently, around the world there are approximately 362 recognized species belonging to 15 sections of the genus (Ho and Liu 2001, Mabberley 2008). In India, *Gentiana* is represented by about 68 species. Of these, approximately 32 species occur in Jammu and Kashmir (Garg 1987, Gupta et al. 2012, Maity 2014, Anilkumar et al. 2015, Shabir et al. 2017, 2018).

Gentiana capitata Buch.-Ham. ex D.Don subsp. *harwanensis* Halda was first described by Singh (1976) as *Gentiana harwanensis* G.Singh from Harwan in Kashmir (Jammu and Kashmir) and is endemic to India. The type locality, Harwan (34°09'32" N, 074°54'13" E), is 15 km from Srinagar Kashmir and is within the temperate bio-

geographic region in North-western Himalaya.

Herein, we provide the first record of this subspecies from the Suru valley, in the Kargil district of Ladakh region, India, and extend this subspecies' geographic distribution to the Trans-Himalayan biogeographic region. A detailed description, photographs, and distributional map are included.

Methods

During a recent botanical trip to Suru valley in Kargil district in June 2018, the first author (MS) came across and collected a specimen of the subspecies reported here. The identification was made by consulting the protologue, the relevant taxonomic literature (Agarwal and Bhattacharyya 1982, Garg 1987, Halda 1995, Ho and Liu 2001, Shabir et al. 2018), and herbarium specimens housed in



Figure 1. *Gentiana capitata* Buch.-Ham. ex D.Don subsp. *harwanensis* (G.Singh) Halda. **A.** Habit. **B.** Flower.

the herbaria of Kashmir University (KASH) where the holotype is deposited, National Botanical Research Institute, Lucknow (LWG), and from the image of the isotype deposited in the New York Botanical Garden (NY). The voucher specimens are deposited in LWG.

Morphological characters were observed and pho-

tographs made of the floral parts using a stereo-zoom microscope (Leica). Field photographs were taken by using a camera (Canon EOS D200). Figures were edited using software Adobe Photoshop.



Figure 2. *Gentiana capitata* Buch.-Ham. ex D.Don subsp. *harwanensis* (G.Singh) Halda. **A.** Calyx. **B.** Corolla. **C.** Capsule. **D.** Seeds.

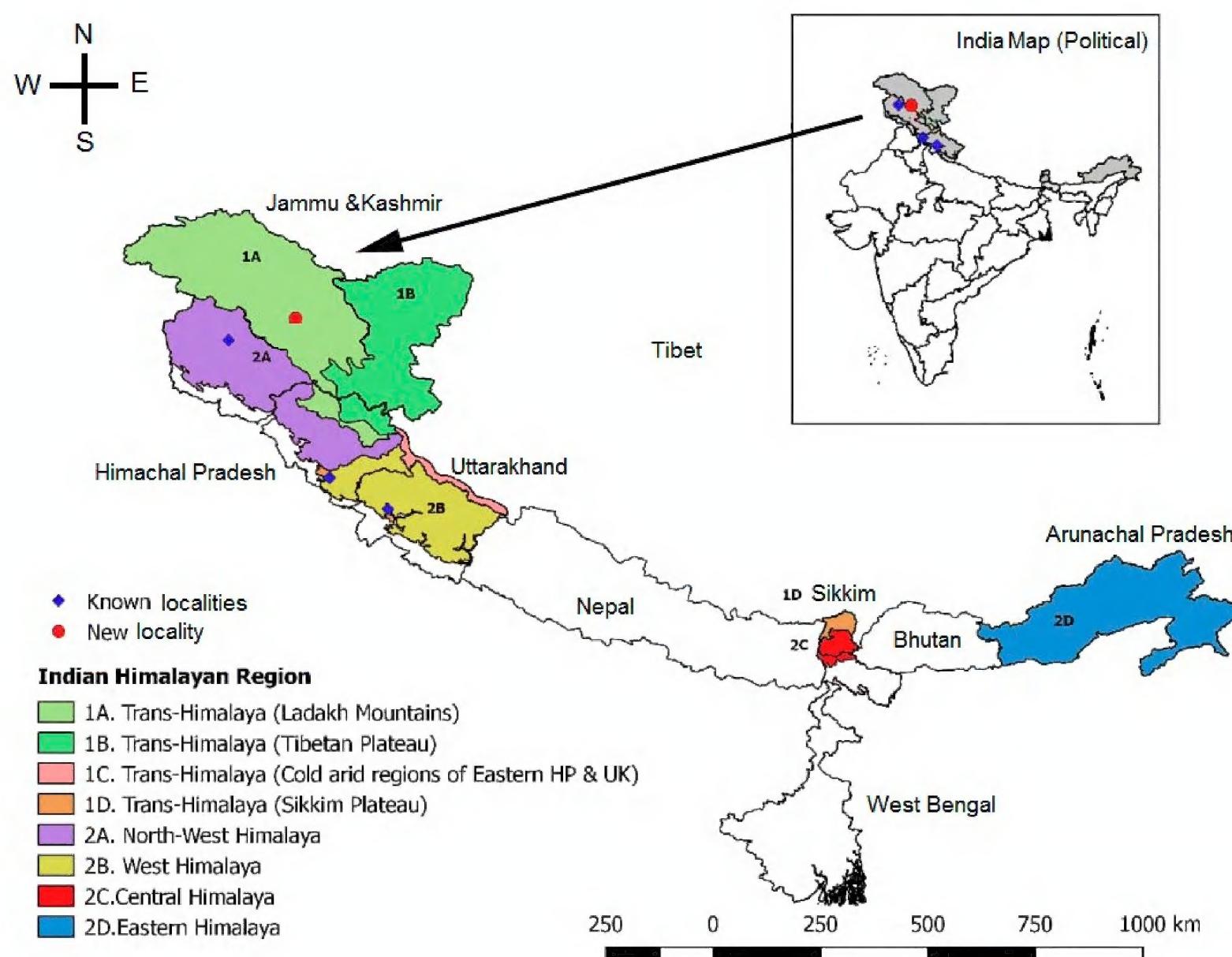


Figure 3. Map showing the distribution of *Gentiana capitata* Buch.-Ham. ex D.Don subsp. *harwanensis* (G.Singh) Halda in Indian Himalayan region.

Results

***Gentiana capitata* Buch.-Ham. ex D.Don subsp. *harwanensis* (G.Singh) Halda. In Acta Mus. Richnov. 3: 36 (1995)**

Figures 1, 2

Type. Kashmir, Harwan, along drains in forest, 1700 m, 24 April 1969, Gurcharan Singh 1524 (holotype, KASH; isotype, NY- photo!).

Ciminalis harwanensis (G.Singh) Omer. in Edinb. J. Bot. 50(1): 67 (1993).

Gentiana harwanensis G.Singh, Forest Fl. Srinagar. 126. fig. 5. (1976).

New record. India. Ladakh, Trans-Himalayan biogeographic region, Kargil district, Suru valley, riverbed of Suru river at Damsna ($34^{\circ}09'31''$ N, $075^{\circ}57'14''$ E), 3200 m, 10 June 2018, Mohd Shabir, 309945 (LWG) (Fig. 3).

Other specimens examined. India. Jammu and Kashmir: along the drains, Harwan, 1700 m, 24 April 1969, Gurcharan Singh 1524 (KASH); same area, 25 July 1970, Gurcharan Singh 1524 (NY). Shallabugh, 1600 m, 02 September 1982, G.H. Dar 4015 (KASH). Along river Suru, Damsna (Kargil) Ladakh, 3200 m, 10 June 2018, Mohd Shabir 309945 (LWG).

Description. Annual, 2.5–4.0 cm high. Stem quadrangular, finely lineolate. Basal leaves broadly elliptic, 3.8–5.3 × 2.9–3.7 mm, apex acute, subacuminate, quadriserrate,

arranged opposite in 2 series, 3-distinct veins on abaxial surface, mid-vein keeled. Cauline leaves 2–4 pairs, opposite, widely spaced or rarely overlapping, blade 4.4–5.4 × 2.4–3.0 mm, broadly obovate, spatulate, apex acute, recurved, mid-vein keeled abaxially, margin cartilaginous. Inflorescence terminal, clustered, enveloped by upper obovate leaves; pedicel sessile to sub-sessile. Calyx 4.6–5.5 mm long; tube membranous, 3.0–3.5 mm long; lobes 1.5–2.2 × 0.6–0.9 mm, oblong-lanceolate, apex acute, margin membranous, narrowly cartilaginous and crenulate, mid-vein keeled. Corolla 5.4–5.6 mm long; tube 4.5–4.7 mm long; lobes 0.9–1.2 × 0.70–0.85 mm, ovate-oblong, apex acute, margin entire; plicae 0.55–0.75 × 0.45–0.65 mm, ovate, slightly bifid at apex, margin entire. Stamens 5; filaments equal, inserted at the base of corolla tube, 1.34–1.6 mm long; anthers sagittate, ellipsoid, 0.6–0.7 × 0.2–0.3 mm. Style 0.3–0.6 mm long, stigma rounded. Capsule 3.1–5.2 × 1.7–3.5 mm, clavate, obovate and winged distally along the suture. Seeds winged, 0.5–0.6 × 0.20–0.25 mm, brown and surface reticulate.

Diagnostic characters. This subspecies is characterized by its stem not naked below, apically branched; basal leaves rosulate, caulin leaves obovate to spatulate, 3 or 4 pairs; flowers sessile to sub-sessile, clustered (3–5) into a terminal head; calyx tube membranous, lobes ovate-oblong, margins narrowly cartilaginous and crenulate; corolla lobes ovate with acute apex; plicae bifid; capsules obovate with their base truncate.

Key to the infraspecific taxa of *Gentiana capitata*

- 1 Stem naked below, calyx lobes margin purple or white and broadly membranous.....
..... *G. capitata* subsp. *capitata*
- Stem not naked below, calyx lobes margin narrowly cartilaginous and crenulate..... *G. capitata* subsp. *harwanensis*

Discussion

Singh (1976) in his protologue of *Gentiana harwanensis* G.Singh mentioned that the taxon is closely allied to *G. aquatica* L., but differs from the latter in having fasciculate, campanulate flowers into terminal head, almost sessile flowers, obovate to spathulate leaves and bifid plicae. Later, Agarwal et al. (1981) refined the description of *G. harwanensis* because the Singh's (1976) original description did not adequately incorporate the differentiating characters of taxonomic value. Agarwal et al. (1981) also observed that the plant is close to *G. riparia* Kar. & Kir., *G. albicalyx* Burkill and *G. capitata* Buch.-Ham. ex D.Don, but not to *G. aquatica* as observed by Singh (1976). Omer (1993) transferred the taxon to the genus *Ciminalis* Adans., and Halda (1995) gave subspecies rank to *G. harwanensis* (as *G. capitata* subsp. *harwanensis*). Shabir et al. (2017) also treated this taxon as a subspecies.

Gentiana capitata subsp. *harwanensis* is endemic to India, where it is known from the submontane and temperate regions in Kashmir, Himachal Pradesh, and Uttarakhand in Indian western Himalaya (Singh 1976, Garg 1987, Gupta et al. 2012, Shabir et al. 2017). The IUCN (2012) categorized it as Data Deficient.

Although major taxonomic explorations have been made in the Ladakh Trans-Himalayan region (Kachroo et al. 1977, Klimeš and Dickore 2005, Chaurasia et al. 2007, Srivastava and Shukla 2015), but there are no reports available on the occurrence of this subspecies in the region. Our report of this subspecies in Suru valley extends its geographic distribution to the Ladakh Himalaya, which is within the Indian Trans-Himalayan biogeographic region.

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Authors' Contributions

MS collected and photographed the specimens. MS and AAK identified the specimens. MS wrote the manuscript, designed the distribution map and edited the figures. AAK, PA, JKT, and TH analyzed the data, edited and refined the manuscript.

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